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2. Author's last name (see Author Index for complete name). Departments in regular issues are denoted by the following code:
   - Trends .....Trends in Technology or Trends in Design & Development
   - Scan .....Scanning the Field for Ideas
   - DIA .....Design in Action
3. Date of issue. MACHINE DESIGN *Reference Issues* are denoted by the following code:
   - F .....*Fasteners* (March 11)
   - MD .....*Mechanical Drives* (June 17)
   - M .....*Metals* (September 9)
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Determining Cam Profiles ..... Myatt 6/10 174 (3.0)
Toggle Mechanisms ..... Saelman 7/22 185 (2.5)
Bearing Reliability and Capacity ..... Mischke 9/30 139 (2.0)
Storable Tubular Extendible Member Rimrott 12/9 156 (10.0)
Intermittent Rotary Motion ..... Bickford 12/23 119 (13.0)
Pull Tightens Grippers Pinch ..... Scan 1/7 125 (0.5)
Rectangular Cam Makes "Push-Push" Switch ..... Scan 2/4 115 (0.7)
Orbiting Ball Provides High-Speed Wiggle Scan 3/18 178 (0.5)
Balanced Lever Governs Torque ..... Scan 4/1 113 (1.0)
Tunable Stethoscope Listens Discriminately ..... Scan 4/29 215 (0.6)
Convex Cam Clamps Itself ..... Scan 5/13 191 (0.6)
Pawls Deliver Uniform Torque ..... Scan 5/27 139 (0.5)
Flexible Diffuser Adjusts to Air Flow Scan 6/24 143 (1.0)
Piston Cam Actuates Cutter ..... Scan 7/22 146 (0.6)
Stepped Pawls Subdivide Ratchet Increment ..... Scan 7/22 148 (0.5)
"Saw-Tooth" Blades Vary Mix Speed .. Scan 8/19 157 (1.0)
Disappearing Cam Lobe Controls Engine Valve ..... Scan 8/19 160 (0.5)
Rolling Crank Amplifies Motion ..... Scan 9/2 123 (1.0)
Linkage Adjusts Itself for Temperature Changes ..... Scan 9/2 124 (0.5)
Slide Track Indexes Whirling Plug-In .. Scan 9/16 174 (1.0)
Split Arbor Flexes to Grip ..... Scan 10/28 152 (0.5)
Spring-Floated Fingers Regulate Torque Scan 12/23 132 (0.5)
Radial Squeeze Secures Shaft-Mounted Parts ..... Scan 12/23 132 (0.5)
Loading Ramp Automatically Finds Truck DIA 1/7 32 (0.6)
Mechanical Thumb Flips Paperback's Pages ..... DIA 2/18 22 (1.2)
Rolling-Contact Cams Vary Suspension Spring Rates ..... DIA 2/4 23 (1.0)
Off-Road Truck Tucks Up Wheels to Dump ..... DIA 4/1 32 (1.0)
Japanese Excavator Digs and Dumps with Swinging Booms ..... DIA 4/29 39 (0.7)
Swing-Out Rollers Speed Printing Press Output ..... DIA 8/19 31 (1.0)

37, 39. Controls and Systems

Hot Squeeze Pushes Piston ..... Scan 4/15 162 (0.5)
Paired Gratings Measure Light Angle ... Scan 4/29 213 (0.6)
Intermeshed Fingers Control Drag ..... Scan 7/8 127 (0.5)
Notched Latch Provides Torque Fuse .. Scan 7/8 128 (1.0)
Paddle Wheels form Digital Readout .... Scan 3/18 176 (1.0)
Displaced Image Measures Torque ..... Scan 3/18 178 (0.5)
Speed-Sensitive Pitch Adjustment ..... Scan 7/8 127 (0.5)
Speed - Sensitive Balls Adjust Rotor Balance ..... Scan 9/30 119 (1.0)
Spring Push Limits Fan Speed ..... Scan 10/28 150 (1.0)
Paper Pincher Detects Double Documents DIA 6/10 22 (2.0)
Sweeping Switch Arm Operates Three-Digit Readout ..... DIA 9/2 37 (0.5)

Assembly Components

41. Fasteners

Plastic Fasteners ..... Poe 1/7 127 (5.0)
High Temperature Joints ..... Baumgartner 1/21 166 (6.0)
Metal/Plastic Assemblies ..... Ehner 2/18 183 (3.0)
Terminology ..... Belford F 3/11 4 (4.0)
Fastener Materials ..... (Chapter) F 3/11 8 (3.0)
Finishes and Coatings ..... (Chapter) F 3/11 12 (3.0)
Joint Design ..... (Chapter) F 3/11 15 (14.0)
Fastener Evaluation ..... Brenner F 3/11 29 (3.0)
Tapping Screws ..... (Chapter) F 3/11 32 (6.0)
Set Screws ..... Kuli F 3/11 38 (4.0)
Studs ..... Waltermire F 3/11 42 (2.0)
Resistance Welded Fasteners ..... Grey F 3/11 44 (3.0)
Arc-Welded Fasteners ..... Singleton F 3/11 47 (4.0)
Locknuts ..... (Chapter) F 3/11 51 (4.0)
Single-Thread Engaging Nuts ..... Seitz F 3/11 55 (3.0)
Anchor Nuts ..... Mihaly F 3/11 58 (2.0)
Caged Nuts ..... Seitz F 3/11 60 (2.0)
Clinch Nuts ..... Massey F 3/11 62 (2.0)
Self-Piercing Nuts ..... Steward F 3/11 64 (2.0)

Inserts	Musagnug	F 3/11	66	(4.0)
Washers	Hurst	F 3/11	70	(4.0)
Sealing Fasteners	(Chapter)	F 3/11	74	(4.0)
Pin Fasteners	Braendel	F 3/11	78	(5.0)
Small Rivets	(Chapter)	F 3/11	83	(4.0)
Blind Rivets	Freeman	F 3/11	87	(3.0)
Spring Clips	Seitz	F 3/11	90	(6.0)
Stamped Retaining Rings	Wurzel	F 3/11	96	(3.5)
Wire-Formed Retaining Rings	Munsey	F 3/11	99	(3.0)
Spiral-Wound Retaining Rings	McCormick	F 3/11	102	(5.5)
Quick-Operating Fasteners	Barry	F 3/11	108	(4.0)
Matching Fastener Holes	Bennett	4/1	127	(2.0)
Resistance-Welded Fasteners	Olszewski	6/10	169	(5.0)
Bolt Point Reactions	Yenger	6/24	181	(2.0)
Nut Design Factors	Viglione	8/5	137	(5.0)
Machine Set Studs	Johnson	8/19	166	(3.0)
Fastener Preload	Blake	9/30	128	(4.0)
Explosion in Tubing Gently Separates Rocket Stages	Trends	4/29	10	(0.6)
Double Nut Provides Two-Speed Linear Drive	Scan	2/18	172	(1.0)
Screws Drive Telescoping Cylinder	Scan	3/18	177	(0.5)
Push-Pull Nut Tightens Without Torque	Scan	8/5	126	(1.0)
Collapsible Notches Yield Continuous Ring	Scan	9/16	175	(0.5)
Segmented Nut Separates Explosively	Scan	9/30	118	(0.5)
Dual Threads Double-Lock Blind Fastener	Scan	10/14	198	(0.5)
Cocked Washer Provides Torqueless Screw Lock	Scan	10/14	198	(0.5)
Slotted Bolt Locks Itself	Scan	10/14	200	(0.5)
Flexible Threads Distribute Load	Scan	10/28	152	(0.5)
Spherical Seat Accommodates Bolt Tilt	Scan	10/28	175	(0.5)
Retaining O-Rings Ease Coupling Assembly	Scan	11/11	196	(0.5)

42. Springs; Vibration and Shock Isolators

Air Springs	Hirtreiter	4/1	104	(9.0)
Maximum Velocity of Springs	Morcos	6/24	145	(4.0)
Elastomeric Mounting Systems	Meyer	6/24	184	(3.4)
Vibration-Isolation Systems: Part 1	Feinberg	7/22	138	(7.0)
Vibration-Isolation Systems: Part 2	Feinberg	8/5	142	(8.0)
Spring Selection Simplified	Johnson	9/16	192	(5.0)
Built-In Damping: Part 1—The Theory	Thorn	11/25	174	(6.0)
Built-In Damping: Part 2—The Design Method	Thorn	12/9	166	(6.0)
Belleville Washer Relieves Pressure	Scan	1/7	125	(0.5)
Flat-Wire Spring Pushes in All Directions	Scan	3/4	127	(0.6)
Two Stage Isolator Does Double Duty	Scan	5/13	187	(1.0)
Resilient Ring Provides Soft Bearing Mount	Scan	5/13	189	(0.6)
Buckled Springs Lift Platform	Scan	6/10	159	(0.5)
Spring Reinforces Coupling	Scan	6/10	160	(0.5)
Spring Clutch Locks Nut	Scan	6/10	160	(0.5)
Cantilever Springs Maintain Hot Wire Tension	Scan	6/24	142	(0.5)
Suspended Tape Cancels Vibration	Scan	6/24	144	(0.5)
Squeezed Spring Accommodates Seal Fluctuations	Scan	10/14	197	(1.0)
Deforming Wire Absorbs Shock	Scan	12/23	111	(1.0)
Suspended-Cable Floor Eliminates Audible Reflections	Scan	12/23	112	(0.5)
Multi-Wheel Trailer Integrates Undulations	DIA	4/1	34	(0.5)
Hydraulic Crash Barrier Cushions Car Impact	DIA	10/ 1	40	(1.0)

43. Other Assembly Components

Designing Lifting Attachments	Moore	3/18	181	(4.7)
Music-Wire Tire Will Absorb Road Shocks on the Moon	Trends	1/21	14	(0.6)
Rotating Cushions Float New Transporter Over Any Terrain	Trends	5/13	12	(0.5)
Joint Makes Tubes Self-Clamping	Scan	7/22	148	(0.5)
Flexing Beam Permits Knob Override	Scan	8/5	127	(0.5)
Flip-Flop Latch Indicates Position	Scan	10/14	199	(0.6)
Meshed Gear Segments Form Continuous Hinge	Scan	11/11	198	(0.5)
Bolt-On Rollers Make Semipermanent Conveyor System	DIA	3/4	28	(0.5)

Materials

51. Ferrous Metals

High-Alloy Ultra High Strength Steels	Hamaker	6/10	187	(5.0)
Fatigue in Constructional Steels: Part 1—Basic Considerations	Martin	8/5	130	(7.0)
Fatigue in Constructional Steels: Part 2—Application of Fatigue Data	Martin	8/19	161	(5.0)
Gray, Ductile, and High-Alloy Irons	Walton	M 9/9	4	(7.0)
Malleable Iron	Heine	M 9/9	11	(3.0)
Carbon and Low-Alloy Steels	Briggs	M 9/9	14	(5.0)
High-Alloy Steels	Schoefer	M 9/9	19	(6.0)
Carbon Steels	Parker	M 9/9	25	(7.0)
High-Strength Low-Alloy Steels	Sullavin	M 9/9	32	(4.0)
Low and Medium-Alloy Steels	Whiteley	M 9/9	36	(4.0)
Stainless Steels	Kopeki	M 9/9	40	(4.0)
High-Temperature, High-Strength, Iron-Base Alloys	Johnson	M 9/9	44	(5.0)
Ultrahigh-Strength Steels	Hall	M 9/9	49	(2.0)
Free-Machining Steels	Nachtman	M 9/9	51	(3.0)
Understanding Fatigue in Metals	Kling	10/14	202	(7.0)
Steel Head Shapes	Glazebrook	10/28	159	(4.0)
Super 12-Cr Steels	Parker	11/25	160	(12.0)
Deep Diving Alvin Relies on High-Alloy Sphere	Trends	6/24	12	(0.5)
ASTM Recognizes Controlled Ferrite in Alloy Castings	Trends	8/19	170	(1.0)
Frequency Change Tells Metal's Hardness	DIA	5/27	41	(0.5)

52. Nonferrous Metals

Continuous-Cast Copper-Base Alloys	Bailey	2/4	106	(6.0)
High-Strength Aluminum Alloys	Boone	2/18	164	(6.0)
Welded Aluminum Parts	Collins	3/4	128	(6.0)
Aluminum	Rowe	M 9/9	54	(11.0)
Copper	Strubell	M 9/9	65	(8.0)
Nickel	Hall	M 9/9	73	(8.0)
Magnesium	Hanawalt	M 9/9	81	(5.0)
Zinc	Horvick	M 9/9	86	(3.0)
Titanium	Erbin	M 9/9	89	(4.0)
Beryllium	Hawk	M 9/9	93	(2.0)
Refractory Metals	Chellus	M 9/9	95	(4.0)
Precious Metals	Lake	M 9/9	99	(3.0)
Soldering Alloys	Smith	M 9/9	102	(3.0)
Brazing Alloys	Pattee	M 9/9	105	(4.0)
Understanding Fatigue in Metals	Kling	10/14	202	(7.0)
Aluminum for Cryogenic Applications	Kaufman	11/11	199	(7.0)
Two Containers and Cap Win Packaging Design Awards	Trends	4/29	24	(1.0)
Aluminum-Block Engine Powers Chamois	DIA	1/21	22	(1.0)

53, 54. Plastics, Rubber, Elastomers

Plastic Fasteners	Poe	1/7	127	(5.0)
TFE Fluorocarbon Parts	Ricklin	1/21	152	(5.0)
Polypropylene Linkage	Meyer	3/18	179	(2.0)
Lubricating with Elastomers	Thomas	4/1	136	(2.8)
Whisker-Reinforced Plastics	Milewski	5/13	216	(4.4)
TFE-Lubricated Phenolics	Willis	5/27	130	(8.0)
Polycarbonates	Thomas	6/10	162	(7.0)
Polysulfone	Bugel	7/22	193	(2.1)
Elastomers	Mathews	8/19	177	(20.0)
Plastic Sports Car	Trends	1/21	10	(1.0)
Reinforced Plastics Win Design Awards	Trends	4/15	24	(1.0)
Plastic Design Called Practical for High-Rise Steel Buildings	Trends	9/2	14	(0.6)
Plastic Frame Joins Plastic Body Halves on Experimental Racer	Trends	10/14	10	(0.6)
New Process Casts Plastics by the Mile	Trends	10/28	168	(1.0)
Plastic Racer Named Champion for '65	Trends	12/9	12	(0.7)
Foam Quiets Wind's Whistle	Scan	1/21	164	(0.5)
Sticky Beads Form Intricate Insulation	Scan	5/13	190	(0.6)
Spiral Strip Eliminates Conveyor Bearing	Scan	9/16	176	(0.5)

55-58. Nonmetallics, Composites

Sandwich Panels	Gallagher	1/7	143	(5.0)
Open-Face Sandwich Panels	McKinley	2/4	141	(5.0)
Matching Seals and Lubricants	Stephens	1/21	172	(5.0)
Submarine of Glass	Ernsberger	4/29	186	(7.0)
Brittle Materials	Robinson	9/2	118	(5.0)
Coatings	Beach	M 9/9	116	(6.0)
Filament-Wound Cocoons Could Prevent Submarine Disaster	Trends	2/18	12	(0.5)
Nondestructive Test Predicts Strength of Adhesive Bonds	Trends	3/4	141	(1.0)
Eight-Mil Films Bond the F-111 Fuselage	Trends	6/10	10	(1.0)
Crankcase Oil Helps Prevent Forest Fires	Trends	9/16	14	(0.5)
Glass 'Sub Hulls' Pass Three-Year Submergence Tests	Trends	9/16	24	(0.5)
Sticky-Fingered Machine Tests Adhesives	Trends	9/16	186	(0.6)
Varnishing Process Cuts Motor Costs	Trends	10/14	221	(0.6)
Electrically Conductive Cloth Makes New Heater Types Feasible	Trends	11/25	182	(0.7)
Curved Glass Adds Safety and Comfort to Transit Car	Trends	12/9	10	(0.6)
Iodine Solves Slippery Problem in Exotic Metals	Trends	12/9	179	(0.8)
Honeycomb Proves Best for Small Underwater Vehicles	Trends	12/9	182	(2.0)
Solidification Throws Thermal Switch	Scan	4/29	216	(0.5)
Ripples Boost Corrugation Strength	Scan	9/2	125	(1.0)
Rubber Ram Tests Paper Strength	DIA	3/4	30	(0.5)
Rocking Film Makes 3-D Photo	DIA	6/10	34	(0.5)

Manufacturing Methods and Processes

61-63. Metal Casting, Shaping, Forming

Forging vs. Machining	Divine	5/13	192	(5.0)
Steel Forgings	Parker	7/22	153	(19.0)
Casting	Wallace	M 9/9	122	(4.0)
Forging	Burbank	M 9/9	126	(3.0)
Extruding	Cullen	M 9/9	129	(3.0)
Cold Extruding	Schiller	M 9/9	132	(2.0)
Cold Heading	Havlis	M 9/9	134	(2.0)
Stamping	Carter	M 9/9	136	(2.0)
Deep Drawing	Bartle	M 9/9	138	(2.0)
Spinning	Wenman	M 9/9	140	(2.0)
Roll Forming	Vanderploeg	M 9/9	142	(2.0)
High-Energy-Rate Forming	Zernow	M 9/9	144	(3.0)
Powder Metallurgy	Johnson	M 9/9	149	(2.0)
Designing Stampings	Strasser	11/25	172	(2.0)
Punched Holes in Stampings	Strasser	12/23	113	(3.0)
Die Castings Guide the Nike Hercules	Trends	5/27	24	(0.5)
Superplasticity Promises New Metal-Forming Methods	Trends	7/8	147	(1.0)
Hybrid Process Makes Die-Cast Forgings in Brass	Trends	7/22	183	(1.0)
Support Rollers Aid Cylinder Forming	DIA	2/4	30	(0.5)
Self-Feeding Precision Forge Generates Rounds and Squares	DIA	4/15	26	(2.0)
Bar-Bender Rolls Curl Heavy Stock	DIA	9/16	34	(0.5)

64. Metal Joining

Welded Aluminum Parts	Collins	3/4	128	(6.0)
Bonding and Welding Dissimilar Metals	Gatzek	4/29	270	(6.2)
Laser Welding	Miller	8/5	120	(6.0)
Welding and Welding Alloys	Rudy	M 9/9	109	(7.0)
Diffusion Welding	Albom	9/16	179	(4.0)
Ultrasonic Joining	Gellert	12/23	136	(2.6)
Cold Welding Called Promising as Manufacturing Technique	Trends	6/10	14	(0.5)
Zero Leakage Now a Realistic Goal	Trends	9/16	188	(1.0)
Dual Triggers Fire Four-Step Welding Gun	DIA	2/4	30	(0.5)
Pistol-Like Magazine Feeds Stud Welder	DIA	3/18	26	(1.0)
Wedges Secure Fastener-Free Aluminum Hull	DIA	5/13	42	(0.7)
Electron-Beam Focus Can Be Changed During Operation	DIA	6/10	32	(1.0)
Desoldering Irons Inhale Molten Metal	DIA	11/11	37	(1.0)

65-68. Machining, Other Processes

Forging vs. Machining	Divine	5/13	192	(5.0)
Joining of Thermoplastics	Burns	5/27	164	(4.5)
Ion-Sputtered Thin Films	Seeman	8/19	200	(3.8)
Machining	Olofson	M 9/9	147	(2.0)
New Etching Process Produces Sharp Detail	Trends	11/25	180	(0.6)
Transducers Control Space Age Spinning Wheel	DIA	4/15	30	(1.0)
Hot-Coating Process Protects Gears or Giblets	DIA	4/29	32	(2.0)
Die Stack Shaves Tiny Teeth in Gear Blank	DIA	4/29	36	(1.6)
Oscillating Abrasive Wire Slices Semiconductor Crystals	DIA	5/13	39	(1.0)
Laminater Glues Up Beams From Boards	DIA	8/19	28	(1.0)

Design Theory and Techniques

71. Mechanics, Dynamics, Vibration

Vibration Parameters	Korzec	4/1	133	(3.0)
Reflected Inertia	Bowers	8/5	155	(2.0)
Strobes for Vibration Measurement	Kivenson	9/2	126	(8.0)
Stresses at Resonance	Reinert	10/14	227	(6.0)
Estimating Natural Frequencies	Schmitt	12/9	172	(7.0)
New Analysis Method Pins Down Vibration in Weldments	Trends	10/28	169	(1.0)
Shuttling Wires Transmit Vibration	Scan	10/14	201	(0.5)
Push-Pull Wires Indicate Torque	Scan	12/23	112	(0.5)
Test Table Tunes Out Random Vibration	DIA	1/21	23	(1.0)
Resonant Masses Shake Sorting Screen	DIA	1/21	28	(0.5)

72, 73 Strength of Materials, Parts

Predicting Part Failures—Part 1	Johnson	1/7	137	(6.0)
Predicting Part Failures—Part 2	Johnson	1/21	157	(6.0)
High Temperature Joints	Baumgartner	1/21	166	(6.0)
Fatigue Stress Using Mohr's Circle	Little	3/4	143	(6.0)
Ring Redundants	Isakower	3/4	149	(3.0)
Natural Frequencies of Cantilevered Ring Segments	Ojalvo	3/18	191	(4.5)
Precision Elastic Limit	Jennings	4/15	163	(3.0)
Bending Moments in Circular Plates	Boutier	4/29	233	(2.0)
Counteracting Gasket Creep	Smoley	5/27	142	(4.0)
Preventing Fatigue Failure	Kaechele	7/22	188	(2.2)
Bending Without Twisting	Johnson	11/11	227	(3.0)
Rotating Shaft Deflection	Hesse	12/9	185	(4.6)
Stress Concentrations for Holes in Cylinders	Little	12/23	133	(3.0)

74. Human Factors, Industrial Design

Survival in the Marginals	(Article)	1/7	110	(5.0)
Space Suit Progress—1: Dress Rehearsals for Apollo	Barnes	2/4	100	(6.0)
Space Suit Progress—2: Hot Stunt Men and Hydraulic Stand-Ins	Barnes	2/18	160	(4.0)
Human Vibration Limits	Barnes	6/10	144	(6.0)
Warning-Systems Design	Seminara	9/30	106	(11.0)
Computer 'Corrects' the Road During Auto-Driver Reaction Studies	Trends	2/4	10	(0.7)
Safety and Entertainment Stressed in New Idea Car	Trends	2/18	10	(0.6)
Zero-Friction Vehicle Zero-g for Astronauts	Trends	3/4	14	(0.7)
Zero-Gravity Bed Buoys a Patient and Relieves His Pain	Trends	5/13	12	(0.5)
"Marinated" Researchers Test Zero-G Reactions	Trends	9/30	10	(0.5)
IDSA Presents Design Awards	Trends	10/14	22	(1.6)
Crashing Cadavers Contribute to Dummy Design	Trends	11/11	12	(0.5)
Air-Spring Seat Conforms to Any Size Trucker	DIA	5/13	26	(2.0)
Scuba Life Jacket Safeguards Downed Pilot	DIA	8/19	26	(1.0)
Styling Keynotes German 66's	DIA	11/25	26	(0.5)
Turning Lens Duplicates Human Field of View	DIA	11/11	26	(2.0)

75. Design Analysis, Dimensioning

Sandwich Panels	Gallagher	1/7	143	(5.0)
Fatigue Stress Using Mohr's Circle	Little	3/4	143	(6.0)
Geometric Computing—Part 1: The Method and Its Application	Gellert	3/18	152	(8.0)
Redundancy	Nichols	3/18	170	(4.0)
Natural Frequencies of Cantilevered Ring Segments	Ojalvo	3/18	191	(4.5)
Geometric Computing—Part 2: Fields of Application	Gellert	4/1	94	(7.0)
Feedback Control Systems: Part 1—Tools of the Trade	Branson	4/15	166	(5.0)
Nomographs from Experimental Data	Bolthouse	4/15	171	(3.0)
Geneva Wheel Inertia	Weiss	4/15	181	(2.0)
Feedback Control Systems: Part 2—Deriving Block Diagrams	Branson	4/29	217	(6.0)
Feedback Control Systems: Part 3—Graphical Techniques	Branson	5/13	201	(5.0)
Graphic Data Processing	Smith	5/27	117	(7.0)
Natural Frequencies of Thin Rectangular Plates	Vet	6/10	183	(3.0)
Designing Rotary Inertia Systems	Mischke	6/24	134	(7.0)
Verifying the Installation of Products	Finch	8/5	102	(6.0)
Physical Schematic Diagrams	Roth	9/2	137	(3.0)
Thin Cantilever Beams	Meyer	9/2	147	(3.0)
Analyzing Mechanisms with an Analog Computer	Keller	10/28	153	(6.0)
Temperature Change in Hydraulic Systems	Dodge	10/28	163	(3.0)
Momentary Peak Shaft Loads	Tuplin	10/28	171	(4.5)
Developing Schematics	Feist	11/11	186	(8.0)
Plain-Talk Computer Cuts Calculating Time	Trends	4/15	14	(0.6)
Proposed Helicopter: Swiveling Tail Rotor Propels and Steers	Trends	5/13	14	(0.6)
Computer-aided Drafting 25 Times Faster than Man	Trends	6/24	129	(0.5)
Signatures in Sound Diagnose Machine Illnesses	Trends	8/19	14	(0.6)
Computer Processes Engineering-Change Notices	Trends	9/30	134	(2.0)
Design Data to Manufacturing Instructions in Minutes	Trends	11/25	185	(0.8)
Gemini Rendezvous Practiced in Sliding Simulator	DIA	1/7	28	(1.0)

76. Basic Sciences

Progress Toward Intelligent Machines ..	Griffith	1/7	148	(3.6)
Exploiting the Oceans	Stephan	3/4	114	(5.0)
Mounting Optical Elements	Cade	7/8	133	(3.0)
Infrared	Leftwich	9/16	154	(6.0)
Optics and Optoelectronics	Tippett	10/28	180	(0.6)
Gamma Beam Teams with Radar to Warn Pilots of Dangerous Air	Trends	11/11	22	(0.5)
Overlapping Images Measure Rod Diameter	Trends	4/15	160	(1.0)
Liquid-Meta? Studies Pinpoint Radiator-Design Problems	Trends	9/16	14	(0.5)
Force-Field Theory Explains Molecular Sieve's Shortcomings	Trends	11/11	22	(0.5)
Optical Lever Measures Displacement ..	Scan	5/27	150	(0.5)
Wiggling Mirror Indicates Cavity Shape	Scan	8/5	129	(1.0)
Vibrating Mirrors Indicate Light Beam Position	Scan	9/16	175	(0.5)
Circulating Sand Heats Air	Scan	9/16	176	(0.5)
Fly's-Eye Lens Makes 1250-Image Photo	DIA	2/4	28	(1.0)

77. Experimental, Advanced Design

Are Bigger Machines Better?	Wise	5/27	124	(6.0)
Progress Report on Rigid Rotors	Trends	1/7	12	(0.5)
400 mph Called Feasible for Rigid Rotor Helicopter	Trends	1/7	12	(0.5)
Profilometer Shows Road Blemishes Can Ruin the Ride	Trends	2/4	12	(0.5)
Progress Reported on Two Apollo Boosters	Trends	2/18	14	(0.5)
Hot Gas Spins Helicopter Rotor	Trends	2/18	14	(0.5)
Meteoroids Riddle Pegasus Wings As Scheduled	Trends	3/18	14	(0.6)
SST Design: Double-Delta is Checking Out in Wind-Tunnel Tests	Trends	4/15	12	(0.7)
Hardware Is Ready: Surveyor Prepares for the Moon	Trends	4/15	22	(1.0)
Critical Tests Will Decide the Future for Inflatable Space Structures	Trends	4/29	12	(0.5)
Progress Is Reviewed on the Fixed-Wing Supersonic Transport	Trends	4/29	14	(0.6)
Molab Life Support Systems Pass First Tests in a Mockup	Trends	4/29	22	(0.7)
For '66: R & D Spending To Be Up Slightly	Trends	12/23	6	(0.5)

78. Environmental Design

Corrosion Resistance	Groves	4/1	119	(5.0)
Off-the-Shelf Oceanography	Barnes	8/5	114	(6.0)
Lunar Landing Research Vehicle	Barnes	11/25	146	(5.0)
Crackups and Cartoons Help Solve Lunar-Landing Problems	Trends	4/1	12	(0.7)
Hazards Are About As Predicted	Trends	5/13	22	(1.5)
Particles and Plasma Pommel the Packages	Trends	5/13	24	(0.5)
Moon-Machine Instruments Will Be Tested Aboard Earth Lab	Trends	5/27	12	(0.6)
Picking Up the Pace on Apollo	Trends	5/27	22	(1.5)
Mariner Success Seems Assured for July 14	Trends	7/8	12	(1.0)
Gemini 5 Orbit Time Will Match One Apollo Trip	Trends	8/5	10	(0.5)
Inflatable Still Desalts Ocean Water ..	Trends	9/16	10	(0.5)
Satellites Hint Meteoroids Aren't Too Dangerous	Trends	9/16	12	(0.5)
Deepstar-4000 Makes Ready for Dives to Design Depth	Trends	9/30	12	(1.0)
Dam Divers Defeat Decompression Dilemma	Trends	11/25	14	(1.3)
Spacecraft Testers Will Work in a Vacuum	Trends	12/9	10	(0.7)
Aluminaut Sets a Diving Record	Trends	12/9	14	(0.6)
Sea Sarong: A New Look in Wet-Suit Design	Trends	12/23	6	(0.5)
Foam-Filled Solar Mirror Inflates in Space	DIA	9/16	30	(1.0)

Engineering Management, Personal

81-84. Engineering Department Operations

The Dispensable Engineers	Bard	2/18	158	(2.0)
Selecting the Right Research Project ..	Suits	4/1	90	(3.0)
Project Scheduling—The Second Generation	O'Brien	4/29	172	(10.0)
Follow-up Techniques for Successful Delegation	Burgess	4/29	183	(3.0)
Engineering Proposals	Morris	5/13	164	(5.0)
New Graphic Symbols for Fluid-Power Circuits	Long	5/13	211	(5.0)
Engineering Impact	Rader	5/27	113	(3.0)
Someone Has To Do the Work!	Lloyd	6/10	143	(1.0)
Creative Disorganization	Bard	6/24	130	(2.0)
Engineering Manpower Audit	Runyon	7/8	102	(8.0)
Programed Instruction for Engineers—Part 1	Gould	7/22	122	(6.0)
What is a "Test"?	Young	7/22	129	(3.0)
Programed Instruction for Engineers—Part 2	Gould	8/5	108	(4.0)
Evaluate Your Engineers	Marvin	11/11	168	(4.0)
The Search for Supervisors	Hoffman	11/25	132	(5.0)
Profit Improvement Program for Design Engineering	Poyser	12/23	88	(6.0)
Engineering Supervision—2: What Supervisors Do	(Article)	12/23	94	(3.0)
Engineers Needed, 1973	Trends	1/7	108	(0.5)
Survey Shows Increase in Engineering Salaries	Trends	3/18	150	(0.8)
Drafting by Computer	Trends	6/10	12	(0.7)
'Lab Road' Creates Hills for Full-Size Truck Testing	Trends	7/22	14	(0.6)
DoD Personnel Ask Questions First, Research Later	Trends	9/16	152	(0.6)
Role of Engineers in Management Is Discussed	Trends	10/14	178	(0.6)
Flexible Platen Marks on Curve	Scan	8/5	127	(0.5)
Desk-Top Copier Makes Reproductions of Any Length	DIA	2/4	26	(1.0)
Plotting Table Makes Program Tape	DIA	2/18	30	(0.5)
Tripod Compass Draws Error - Free Ellipses	DIA	3/4	28	(0.5)
Drawing Blade Goes in Circles	DIA	9/16	42	(0.5)
T-Shaped Tracer Eases Pipe-Drawing Chores	DIA	9/30	35	(0.5)

85-86. Technical Information, Patents

Indexing vs Classification	Lancaster	1/7	105	(3.0)
Tonic for Technical Talks	Ebel	1/21	136	(4.0)
Patent Right and Rewards	(Article)	2/4	94	(5.0)
Problems with Patents	(Article)	2/18	152	(5.0)
Fluid Power Graphic Symbols	Long	2/18	199	(6.0)
Should the U. S. Stamp Out Patents?	(Article)	3/4	111	(3.0)
Fluid-Power Standards	Pippenger	5/13	197	(4.0)
Plan Ahead for Publication	Olson	10/28	126	(5.0)
Classifying Information	Taulbee	12/9	191	(3.5)
Images Appear from Microfilm Wand ..	DIA	12/23	26	(1.0)

87. Personal and Professional

Ivorytowerism	(Articles)	1/7	102	(3.0)
In-Plant Engineering Refresher Course	Ziemke	1/21	142	(4.0)
The Great Debate: Which Way Engineering Education	(Article)	3/4	102	(1.0)
The Great Debate: An Industrialist's Viewpoint	Rader	3/4	103	(2.0)
The Great Debate: An Educator's Viewpoint	Davidson	3/4	105	(3.0)
The Great Debate: A Space Engineer's Viewpoint	Purser	3/4	108	(2.5)
European Engineer	Williams	3/18	138	(12.0)
Stimulating Invention	(Article)	4/1	86	(4.0)
Learn to Play Your Hunches	Raudsepp	4/15	132	(6.0)
A Consulting Career	Campbell	4/15	139	(3.0)
Money Can Compromise Creativity ...	Macklin	5/13	169	(2.0)
Testing for Creativity—Part 1: Cognitive Problem-Solving Tests	Raudsepp	5/27	106	(7.0)
Testing for Creativity—Part 2: Perception-Personality Tests	Raudsepp	6/10	136	(6.0)
Testing for Creativity—Part 3: Personality Tests	Raudsepp	6/24	122	(7.0)
Management Clinic: Protecting Trade Secrets	Marvin	7/8	112	(2.0)
State of the Unions—Part 1: Engineers' Attitudes toward Unions	(Article)	8/19	140	(5.0)
State of the Unions — Part 2: How Unions Affect Engineers	(Article)	9/2	102	(3.0)
Management Clinic: Let Go of Technical Details	Schrenk	9/2	105	(2.0)
Designing a Resume That Sells	Andrews	9/16	146	(4.0)
Engineers Appraise Societies	(Article)	9/16	150	(2.0)
Engineering-Technician Certification	Peterson	9/30	88	(4.0)
It's Better to Work for Yourself	Gernhardt	9/30	92	(1.0)
Conformity and the Engineer—Part 1 ..	Raudsepp	10/14	172	(6.0)
Management Clinic: Prospects for Engineers in Top Management	Rader	10/14	179	(2.0)
Conformity and the Engineer—Part 2: Constructive Nonconformity	Raudsepp	10/28	122	(4.0)
The Engineer in Research	Raudsepp	11/11	172	(4.0)
Improve Your Image	Dunn	11/25	138	(4.0)
Engineering Supervision—3: Supervisors Rate Their Engineers	(Article)	12/9	134	(4.0)
Technical-Manpower Market Looks Good Through 1970	Trends	11/11	176	(0.5)
High-School Image of Engineering is Fuzzy	Trends	12/9	138	(0.7)
Conferees Discuss Problems of the Professional Engineer in Industry	Trends	12/23	97	(1.0)

Specific Machines and Equipment

911. Ordnance, Missiles

Shells Into Orbit	(Article)	1/7	115	(3.0)
A Case for Solid Rockets	(Article)	10/28	132	(4.0)
Single-Barrel Missile Launcher Shoots ASROCs or Terriers	Trends	6/24	14	(0.5)
Fly-by-Wire Missile Scores Bulls-Eyes on Tanks	Trends	9/30	10	(0.5)
Sub-Hunting Torpedo Joins the Fleet	Trends	11/11	10	(0.5)
Clip-Loaded Cannon Served by Built-In Crane	DIA	6/24	25	(1.0)

912. Machinery

Whirling Discs Separate Three-Component Mixture	Scan	6/24	142	(0.5)
Flexible Strip Grips Regardless of Ball Size	Scan	8/19	160	(0.5)
Demonstrator Shows Earth Orbits	DIA	1/21	26	(0.5)
Fail-Safe Carrier Puts Bite on Coil	DIA	2/4	22	(1.0)
Beach Sweeper Cleans Up After Litter Bugs	DIA	2/18	30	(0.5)
Programmed Sack Stacker Loads Delivery Trucks	DIA	3/4	22	(2.0)
No Strings on Sea-Bottom Sampler	DIA	4/1	26	(1.0)
Steel Strapper Turns Out Tight Coils	DIA	4/15	39	(1.0)
Straight Sweeping Blade Clears Wheelhouse Windshield	DIA	4/15	45	(0.5)
Washing Machine Gives Substrates Dozen Dunkings	DIA	4/29	26	(2.0)
High Speed Roller Deburrs Flat Metal Parts	DIA	6/10	34	(0.5)
Ice-Cubes Form in Freezer Conveyor Belt	DIA	6/24	27	(1.0)
Soil Tester Pushes Itself into the Ground	DIA	7/22	30	(1.0)
X-Ray Sensor Sorts Spuds from Stones	DIA	7/22	32	(0.5)
Self-Propelled Conveyor Scoots Cargo on Powered Rollers	DIA	9/2	34	(1.0)
Excavator Digs and Rolls Under Hydraulic Power	DIA	9/16	26	(2.0)
Tea Is Served by Not-So-Dumb Waiter	DIA	9/16	39	(0.6)
Crane Mounted Conveyors Carry Crumble-Free Coke	DIA	9/16	42	(0.5)
Hollow-Cathode Furnace Melts with Argon-Plasma Beam	DIA	9/30	28	(1.0)
Supplies Ride Ship-to-Ship Trolley	DIA	10/14	24	(2.0)
Controlled-Droop Air Lance Cleans Boiler's Tubes	DIA	11/11	30	(1.0)
Sand Stream from Paddle Wheel Smothers Forest Fires	DIA	11/25	22	(2.0)
Crane Tower Grows from Top Down	DIA	11/25	32	(0.5)
Foot Power Moves Wall-Climbing Bicycle	DIA	12/9	36	(0.5)

913. Electrical Machinery

Carrier's Landing System Lines Up Aircraft 20 Miles Out	Trends	4/29	14	(0.7)
LP-Disc Adds Pictures to the Music	Trends	5/27	14	(0.8)
Instrument-Panel Tape Recorder Backs Up Pilot's Memory	DIA	3/4	26	(1.0)
Sun-Pressure Vanes Stabilize Spacecraft	DIA	3/18	22	(2.0)
Plasma Jet Forms Revolving-Oven Cathode	DIA	4/29	30	(1.0)
Darting Arms Play Data From Discs	DIA	5/13	36	(1.0)
Bounced Infrared Beam Triggers Fog Horn	DIA	7/22	32	(0.5)
Phone Meter Shows Unused Talk Money	DIA	9/30	35	(0.5)
Cordless Console Handles Phone Calls Faster	DIA	10/28	22	(2.0)
Skid-and-Go Disc Plays Instantaneously	DIA	12/23	22	(2.0)

914. Automotive, Rail, Marine

Back-Country Sportsters	Barnes	4/15	142	(8.0)
For Manipulating Mammoths . . . Merged Modules	Barnes	1/21	146	(2.0)
Highway Heavyweights	Victors	1/21	148	(4.0)
Designer for Indianapolis	Wood	5/13	174	(8.0)
Ferrari and Others Race at Le Mans	Wise	7/22	132	(6.0)
Design for the Backwater	Baranson	9/2	108	(8.0)
The Similar '66s	Wise	9/30	94	(12.0)
Turbo Titan III	(Article)	8/19	147	(4.0)
Goldenrod Goes for a Record	(Article)	9/16	162	(2.0)
Deep-Water Driller	(Article)	10/28	136	(2.0)
RR Model Change	(Article)	12/9	140	(6.0)
Commercial Deep-Water Hydrofoil Challenges Passenger Aircraft	Trends	8/5	14	(0.5)
Bronco Heads for the Hills	Trends	8/19	12	(1.0)
Power Windows Block Out Noise	Trends	8/19	171	(0.5)
ACVs Try Shuttling Passengers between Bay-Area Airports	Trends	9/2	12	(1.0)
Fastest-Working Vehicles Would Accept Daily Beatings	Trends	10/28	14	(1.0)
150-mph Ferry Proposed as 'Turnpike' of the Future	Trends	11/11	10	(0.5)
Automatic Plow Feels for Furrows	DIA	1/7	26	(1.0)
Air Supports Jet Propelled Bubble Boat	DIA	1/7	30	(0.6)
Carriage Pulls Engineless Railcar	DIA	1/21	26	(0.5)
Diesel Truck Takes 3-Ton Load	DIA	3/18	28	(1.0)
Window-Blind Hatch Cover Speeds Bulk-Cargo Handling	DIA	3/18	32	(0.5)
French Sedan Doubles as Station Wagon	DIA	4/1	22	(2.0)
Cargo-Truck Deck Rocks and Rolls to Match Aircraft Door	DIA	4/29	28	(1.0)
Climbing Barges Bypass Locks	DIA	5/13	30	(0.5)
Rocking Foot Kicks Freight Car Along the Rails	DIA	4/29	34	(1.0)
Swing Out Decks Build Military Bridges	DIA	5/27	26	(2.0)
New Bus Series Offers Street or Highway Designs	DIA	5/27	30	(1.0)
Mechanical Pony Prances While Driver Plods Behind	DIA	7/22	24	(1.0)
Turning Seat in Swinging Cab Improves Driver's View	DIA	7/22	28	(1.0)
Cargo Van Rides on Gimbaled Trailer Frame	DIA	8/5	26	(1.0)
Truck-Body Scale Guarantees Square Meal for Cows	DIA	9/2	37	(0.5)
Squirt-Powered Cart Spots Freight Cars	DIA	9/16	36	(0.5)
Weight-Saving Design Boosts Car Payload	DIA	9/30	30	(1.0)
Radio-Controlled Plow Plants Drainage Pipe	DIA	10/14	42	(0.6)
French Truck Negotiates Tight Corners	DIA	10/14	28	(1.0)
Molten Metal Shuttled in Thermos-Bottle Car	DIA	11/25	32	(0.5)

914. Aircraft, Space Vehicles

Helicopters: Lethal Eagles or Sitting Ducks	Barnes	7/8	114	(6.0)
Shadowy YF-12A Will Go to SAC	(Article)	9/16	160	(2.0)
C-5A: Lockheed's Fleet in One	(Article)	11/11	178	(8.0)
Ramjet Revival	(Article)	12/23	98	(4.0)
Twin-Engine Business Planes Introduced	Trends	3/4	10	(0.7)
Size and Efficiency are Increased for DC-8s	Trends	4/29	12	(0.5)
Jet-Controlling Gyro Promises to Save Spacecraft's Fuel	Trends	5/27	10	(0.5)
Lean Teams Develops Wingless Glider	Trends	7/8	14	(0.6)
Second XB-70A Takes to the Air	Trends	8/5	10	(0.5)
OAO Prototype Proves Durable During Ground Testing	Trends	9/16	12	(0.5)
Second Lifting Body Passes the Half-Built Mark	Trends	10/14	14	(0.6)
Fold-Rotor Aircraft Would Fly 500 mph.	Trends	10/28	10	(0.6)

915. Instruments

Closed-Circuit Television from Mars	(Article)	8/19	150	(2.0)
Scanning Microscope Produces Photograph-Like Image	Trends	6/24	10	(0.6)
Outstanding Designs Are Honored at Trade Fair	Trends	11/11	14	(1.3)
Tapered Pin Measures Holes	Scan	4/15	161	(0.6)
Flopped Light Beam Measures Strip	Scan	5/27	141	(1.0)
Flexing Shutter Measures Pressure	Scan	5/27	140	(0.5)
Variable-Density Filters Insure Correct Exposure	Scan	6/24	144	(0.5)
Vibrating "Finger Nail" Indicates Surface Roughness	Scan	12/9	155	(1.0)
Explosive-Shutter Camera Captures Split-Second Explosion	DIA	4/1	29	(1.0)
Skuffing Pendulum Tests Road's Skid Resistance	DIA	5/13	30	(0.5)
Electrode Reaction Tells Water's Oxygen Content	DIA	5/13	34	(1.0)
Three-Eyepiece Microscope "Digitizes" 0.0001-in. Motion	DIA	5/27	33	(1.0)
Radioactive Anemometer Measures Tiny Air Gusts	DIA	5/27	41	(0.5)
Airborne Camera Horizon to Horizon	DIA	7/8	22	(2.0)
Varying Stylus Speed is Key to Torpedo Test Accuracy	DIA	7/22	22	(2.0)
Lens System Projects Color Motion Pictures	DIA	8/5	22	(2.0)
Twenty-Dollar Polaroid Says Yes When Light is Right	DIA	8/19	22	(2.0)
Touch of a Finger Adds Balance Weights to Scale	DIA	8/19	36	(0.6)
Fan-Mounted Lenses Vary Film Image Magnification	DIA	9/2	26	(2.0)
Tape-Measure Transmitter Signals Web Width Error	DIA	9/16	32	(1.0)
Dial Looks for Bend in the Rod	DIA	9/16	34	(0.5)
Drum Head Senses Earthquake Sounds	DIA	9/16	36	(0.5)
Magnetic Pick Up Coddles Projector Slides	DIA	10/14	32	(1.0)
Detectors Keep Ultrasonic Fingers on Traffic Pulse	DIA	10/14	37	(1.0)
Microwave Interferometer Measures the Untouchables	DIA	10/28	26	(1.0)
Roving Probe Picks Off Selected Light Values	DIA	10/28	28	(1.0)
Self-Monitoring Strobe Emits Just Enough Light	DIA	10/28	30	(1.0)
Panoramic Camera Exposes Tubing Defects	DIA	11/11	28	(1.0)
Trace-Gas Density Tells Storage-Tank Content	DIA	11/11	32	(1.0)
Pulsing Bed Pad Keeps Patients Comfortable	DIA	11/25	26	(0.5)
Float-Driven Recorder Marks Tide Changes	DIA	11/25	29	(1.0)
Wire-Hung Mirror Improves Astrolabe Accuracy	DIA	12/9	32	(1.0)
Radioactive Probe Does On-the-Spot Soil Evaluation	DIA	12/9	34	(1.0)
Thermometer Senses Below 20 K	DIA	12/9	36	(0.5)